

## **2.6.6 ROADWAY DRAINAGE**

### **I. BASIC CONCEPTS**

In the design of bridge drainage facilities, the aim is to keep the traveled way free from hazardous flooding except infrequent, excessively heavy rainstorms. Roadway drainage inlets must be provided to remove water upstream of the structure.

To remove the storm water from the bridge deck, the standard drain inlet shall be used. The deck is used to carry the storm water to these drain inlets. The drains are placed according to hydraulic principles and located next to the curbing. The collected water should be dropped over the median or slope paving. Flexible sealers are used at expansion joints to prevent undesirable leakage through the deck. As a minimum, place one Type I Deck Drain upstream (approximately 10 ft), of any expansion joint to reduce leakage onto the substructure. The intent is to remove the gutter flow ahead of the expansion joint except for larger storms that will infrequently splash over the drain and wet the expansion joint.

The preferred drain is the Type 1. Use the type 2 drain when a larger opening is required by the design procedure. The Type 3 drain should only be used with voided slabs, box beams, and deck bulb tee type structures.

For further reference, see Hydraulic Engineering Circular No. 21, May 1993, "Design of Bridge Deck Drainage."

### **II. DECK DRAIN LOCATION**

1. Avoid locations over Highway or Railroad travel way as piping will be required.
2. Locate over medians, water or slope paving. If over a median, provide a suitable splash pad or downspout to eliminate unsightly erosion.
3. Low points. Usually these will include at least one and frequently all four corners of the bridge deck. In each case the drain shall be placed as close to the corner of the deck as practicable.
4. In the case of bridges where the approach grade is downward toward the bridge, removal of runoff must be handled in the roadway plans. Runoff exiting the structure must be handled similarly. Assurances to this effect should be obtained from the appropriate area engineer. If received verbally, record it in writing and file it in the subject files. Note on **Situation & Layout** sheet for roadway plans to pick up runoff and the volume of runoff involved.
5. Flat areas will require further investigation. Check if bridge can be sloped.
6. Trash, gravel, and ice are the main consideration in designing drainage piping systems.

### **III. DESIGN PROCEDURE**

Refer to Bridge Design Manual [Appendix 2.1](#)

### **Commentary**

HEC-21 can be found at <http://www.fhwa.dot.gov/bridge/hec21.pdf>

Refer to NCHRP 67 for designing drainage piping systems.